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RESEARCH ARTICLE

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Chromosome numbers for the Italian flora: 7

Giovanni Astuti[1], Lijuan Liu[1], Lorenzo Peruzzi[1]

1 *Dipartimento di Biologia, Università di Pisa, Via Derna 1, 56126 Pisa, Italy*

Corresponding author: *Giovanni Astuti* (gastuti@biologia.unipi.it)

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Abstract

In this contribution, new chromosome data obtained on material collected in Italy are presented. It includes a total of 105 chromosome counts for three populations of *Pulmonaria vallarsae* A.Kern. subsp. *apennina* (Cristof. & Puppi) Cecchi & Selvi and for three populations of *P. hirta* L.

Keywords

cytogeography, cytotaxonomy, *Pulmonaria hirta* complex

How to contribute

Texts concerning new chromosome data should be submitted electronically to Giovanni Astuti (gastuti@biologia.unipi.it), including indications on voucher specimens and methods used.

Chromosome counts

Pulmonaria vallarsae A.Kern. subsp. *apennina* (Cristof. & Puppi) Cecchi & Selvi (Boraginaceae)

Chromosome number. $2n = 22$ (Figs 1, 2)

Voucher specimen. ITALY. Emilia-Romagna. Casalecchio di Reno (Bologna), Parco Talon (WGS84: 44.47278N, 10.28416E), 76 m s.l.m., 23 March 2018, *G. Astuti et L. Liu* (PI n° 021283–021302); **Calabria.** San Fili (Cosenza), Foresta Luta (WGS84: 39.34085N, 16.08722E), margine di bosco a *Fagus sylvatica* (più in basso a

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Figure 1. *Pulmonaria vallarsae* A.Kern. subsp. *apennina* (Cristof. & Puppi) Cecchi & Selvi from Parco Talon (Casalecchio di Reno, Bologna), $2n = 22$. Scale bar: 10 μm.

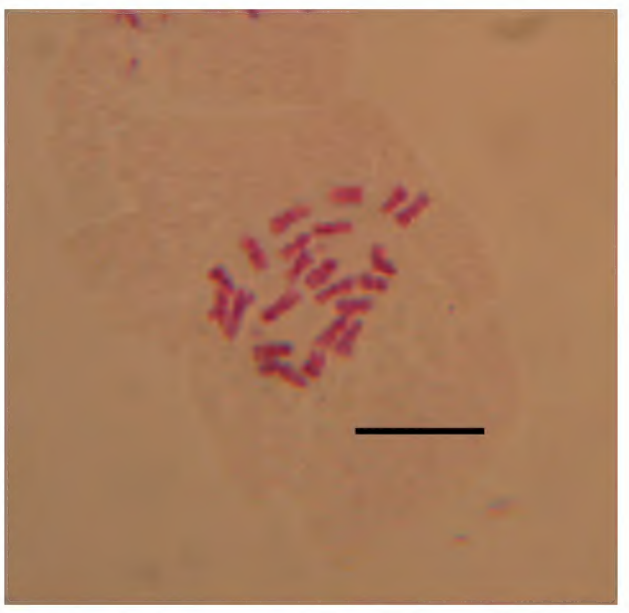

Figure 2. *Pulmonaria vallarsae* A.Kern. subsp. *apennina* (Cristof. & Puppi) Cecchi & Selvi from Foresta Luta (San Fili, Cosenza), $2n = 22$. Scale bar: 10 μm.

Tilia platyphyllos e *Acer platanoides*), 1030 m s.l.m., 5 April 2018, *G. Astuti, L. Liu, F. Roma-Marzio* (PI n° 021323–021342).

Chromosome number. $2n = 26$ (Fig. 3)

Voucher specimen. ITALY. Abruzzo. Rocca di Mezzo (L'Aquila), in Via dei Prati Santi (WGS84: 42.2125N, 13.51305E), lungo il fossato insieme a *Salix apennina*, 1289 m s.l.m., 10 April 2018, *G. Astuti, L. Liu, F. Bartolucci* (PI n° 021303–021322).

Method. Squash preparations were made on root-tips obtained from potted plants. Root tips were pre-treated with 0.4% colchicine for 3 hours and then fixed in Carnoy fixative solution for 1 hour. After hydrolysis in HCl 1N at 60 °C, the tips were stained in leuco-basic fuchsine.

Observations. Puppi and Cristofolini (1996) collected the holotype of the name *P. apennina* from Parco Talon (Emilia-Romagna). All the 18 plants sampled from this population show the typical chromosome number of *P. apennina*, i.e. $2n = 22$, without

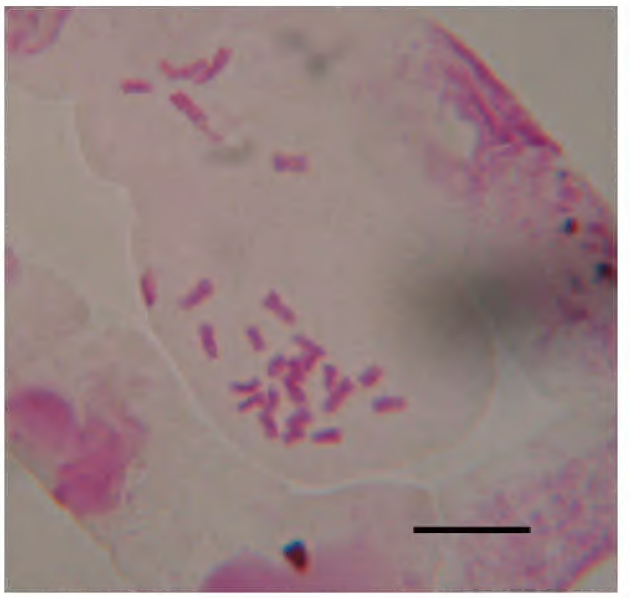

Figure 3. *Pulmonaria vallarsae* A.Kern. subsp. *apennina* (Cristof. & Puppi) Cecchi & Selvi from Rocca di Mezzo (L'Aquila), $2n = 26$. Scale bar: 10 μm.

any variation. Also the chromosome number found in 18 individuals from Foresta Luta (Calabria) is $2n = 22$, and it agrees with a single previous count (Peruzzi and Cesca 2003) available from that area. On the contrary, all the 17 individuals sampled from Rocca di Mezzo (Abruzzo) show $2n = 26$ chromosomes. The identification of these plants was based on morphological features, revised by L. Cecchi on herbarium sheets preserved at APP (F. Bartolucci *in verbis*). Previously, chromosome numbers ($2n = 25, 26$) intermediate between $2n = 22$, typical of *P. apennina*, and $2n = 28$, typical of *P. hirta* (Cecchi and Selvi 2015), were reported from populations in northern and central Apennines (Puppi and Cristofolini 1996, Vosa and Pistolesi 2004). However, this is the first case in which an intermediate chromosome number is constantly observed within a single population.

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***Pulmonaria hirta* L. (Boraginaceae)**

Chromosome number. $2n = 28$ (Figs 4, 5, 6)

Voucher specimen. ITALY. Toscana. Poppi (Arezzo), all'Eremo di Camaldoli (WGS84: 43.80902N, 11.82518E), lungo la SP124 nel tratto che porta dall'eremo al Prato alla Penna, al margine della faggeta, 1150 m s.l.m., 24 April 2018, *G. Astuti et L. Liu* (PI n° 021358–021376); Santa Maria a Monte (Pisa), Valle Lupitana (WGS84: 43.71388N, 10.67218E), nelle schiarite del bosco, 39 m s.l.m., 21 March 2018 *G. Astuti et L. Liu* (PI n° 021343–021357); **Emilia-Romagna.** Grizzana Morandi (Bologna), lungo la SP73 presso la località Favari, (WGS84: 44.22385N, 11.09556E), a margine del querceto, 539 m s.l.m., 19 April 2018, *G. Astuti et L. Liu* (PI n° 021377–021396).

Method. Squash preparations were made on root-tips obtained from potted plants. Root tips were pre-treated with 0.4% colchicine for 3 hours and then fixed in Carnoy

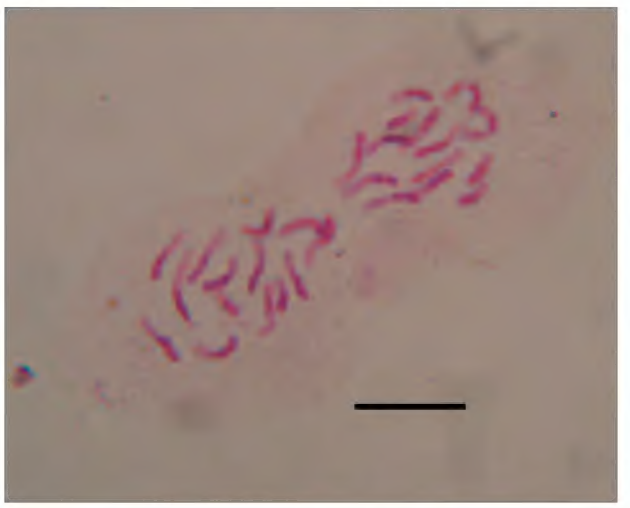

Figure 4. *Pulmonaria hirta* L. from Eremo di Camaldoli (Poppi, Arezzo), $2n = 28$. Scale bar: 10 μm.

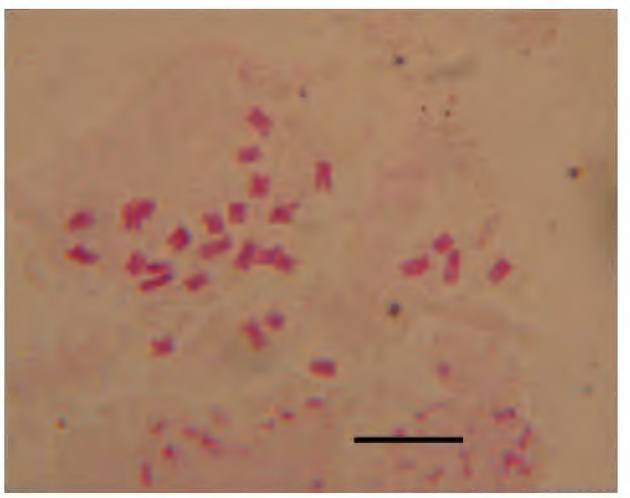

Figure 5. *Pulmonaria hirta* L. from Valle Lupitana (Santa Maria a Monte, Pisa), $2n = 28$. Scale bar: 10 μm.

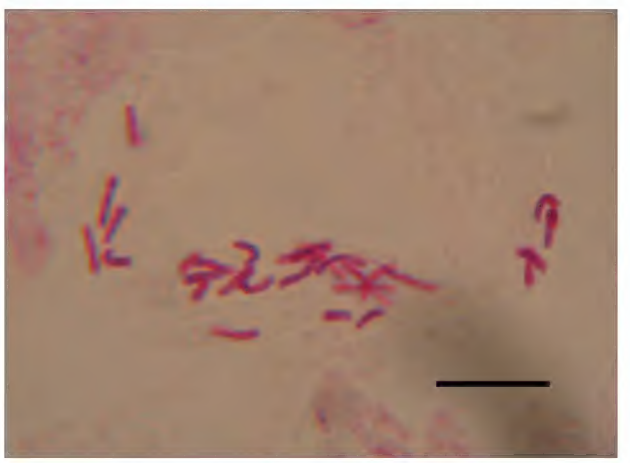

Figure 6. *Pulmonaria hirta* L. from Favari (Grizzana Morandi, Bologna), $2n = 28$. Scale bar: 10 μm.

fixative solution for 1 hour. After hydrolysis in HCl 1N at 60 °C, the tips were stained in leuco-basic fuchsine.

Observations. A specimen collected in Camaldoli (Toscana) was selected as the epitype for the name *P. hirta* by Selvi in Cafferty and Jarvis (2004). We found $2n = 28$ chromosomes, the chromosome number typical of this species (Cecchi and Selvi 2015), and no variation among the 16 individuals sampled in this topotypical popula-

tion. A specimen coming from Valle Lupitana (Toscana) was selected by Puppi and Cristofolini (1996) as the neotype for the name *Pulmonaria picta* Rouy, a heterotypic syonym of *P. hirta*. Also for the 18 individuals sampled in this population, we found $2n = 28$ chromosomes, in agreement with other counts from the same geographical area (Vosa and Pistolesi 2004). The identification of the population from Favari (Emilia-Romagna) was based on morphological features of basal leaves, and the 18 individuals sampled, all showing $2n = 28$ chromosomes, confirmed our identification.

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